Bhandarkar Oriental Research Institute

DAMODAR DHARMANAND KOSAMBI (31-7-1907—29-6-1966)
Author(s): V. V. Gokhale and D. D. Kosambi
Source: *Annals of the Bhandarkar Oriental Research Institute*, Vol. 47, No. 1/4 (1966), pp. 118-130
Published by: Bhandarkar Oriental Research Institute
Stable URL: http://www.jstor.org/stable/41694209
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DAMODAR DHARMANAND KOSAMBI

(31-7-1907—29-6-1966)

Death overtook Prof. D. D. Kosambi in his bed in the early hours of the 29th June '66 prematurely and almost surreptitiously, after he had been declared generally fit on the previous day by his family doctor. It was a case of myocordial infarct. A glance at the accompanying list of his publications will bring home to us the serious loss the world of progressive and talented writers has suffered and the void his death has left among the leading savants of renascent India.

Born at Kosben in Goa, then under the rule of the Portuguese colonialists, Damodar Kosambi was brought up in a family known for its rigorous standards of learning and social behaviour. He had inherited from his father, the renowned Buddhist scholar: Dharmanand Kosambi, an insatiable spirit of inquiry, a love of wandering and a sharp, versatile intellect, which took him quickly ahead of his coworkers and gave his views a rare sense of originality. After some schooling in India, his father, who had accepted a teaching assignment at Harvard (U. S. A.), took him to the Cambridge Latin School, where as a boy of eleven he dedicated himself to a student's hard life until after about eight years we see him emerging as a brilliant young graduate of the Harvard University in Mathematics, History and Languages. On returning to India he worked for a few years at the Banaras Hindu University and then at the Aligarh Muslim University before he decided to settle down in Poona in 1932 as Professor of Mathematics at the Fergusson College,—a College, known for its pioneering services in the field of National Education, and where his father had taught for many years and laid the foundations of Buddhist Studies in Western India. It was during the crucial period of fourteen years he spent at this College, which he in lighter vein characterized as " Rama's exile into the wilderness," that Prof. Kosambi carried on an incessant struggle for mastery in various fields of knowledge and laid the foundations of his greatness as a scholar and a thinker.

Endowed with a powerful and far reaching imagination and an outstanding mathematical ability, Kosambi, who had concentrated his mind almost exclusively upon mathematical research upto 1939, was gradually led to use his abstract methods for obtaining new results in various branches of social sciences. He began by applying statistical methods to Indian numismatics. He was seen weighing with the utmost precision and

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unremitting zeal thousands of punch-marked coins obtained from different Museums in the country and thrashing out his data until he could establish their chronological sequence, forward convincing arguments regarding the economic conditions under which they could have been minted, and discover facts about the dynastic history of the pre-Mauryan period, based upon a wide study of the ancient literary sources and his new metrological findings. The more he examined the productive spirit working behind the panorama of Indian history, the more charmed he was by the manifold aspects of Indian culture, the past as well as the present. While giving mathematical precision to his ideas in the various branches of humanities, he turned almost instinctively to his Sanskrit inheritance. His frank and scholarly estimate of Bhartṛhari's Aphorisms and later of Vidyākara's anthology : Subhāṣitaratnakośa was a standing testimony to his versatile genius and quick mastery of the latest advances in literary criticism. In these and other Indological studies covering a wide range of subjects from the Vedic and the Epic to the classical literature of India he owed as much to Sukthankar's Prolegomena to the critical edition of the Mahābhārata as to the most modern standards of criticism in the West.

Being deeply preoccupied with the entire field of knowledge as it were, it was no wonder that his mathematical lectures in the Fergusson College seemed to go well over the heads of the post-graduate candidates. That as a result of this Kosambi had to leave the College, ought to open our eyes to the dangers involved in our borrowing an examination-ridden system and uninspiring standards of education in this country. The width of his comprehension and his penetrating researches, however, had been making their mark among the scientific circles of India and abroad. It was not long before he was offered the Chair for Mathematics in the Tata Institute of Fundamental Research of Bombay in 1946, which he held for the next 16 years. The new position offered him opportunities of developing closer contacts with scholars of his own calibre all over the world and of meeting his financial responsibilities better than before. Kosambi, however, could not relish the conditions under which he had to work. Living in his own house in the BORI. Colony, Poona, he had to march every morning of the Railway Station and make the "Deccan Queen" his second home in order to attend to his duties in Bombay. Besides, a man of his temperament, solely dedicated to the pursuit of knowledge and social enlightenment was entitled, he thought, to a freedom of thought and action, such as we hardly expect to meet with in an emergent society struggling for its economic independence. All the same, he was able now not only to give a final shape to some of his earlier studies, but to launch upon new orientations in the fields of Biology, Ethnology, Archaeology and

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Pre-history. And every now and then we see him turning back from his study of the social sciences to the development of his research in the comparatively abstract or pure fields of science : the last book he sent out for publication dealt with Prime Numbers. His last major work : The Culture and Civilization of Ancient India (London, 1965), which has now come to be translated into several European and Asiatic languages, set the seal of recognition on his vast erudition, his ability to discover basic motives of human civilization and his brilliant powers of exposition.

It is not for us to estimate the scientific advances made by Prof. Kosambi in the fields of Genetics, Statistics and Mathematics or the part played by him in various other spheres of activity, e. g., in his capacity as Member of the World Peace Council visiting the socialist countries of the East and the West. He believed in the Marxist method of interpreting and changing the human society, but did not hesitate to revise the data of Marx himself in the light of modern research. As an independent thinker with a passionate devotion to scientific research, he seemed to be almost exclusively preoccupied with his own intellectual pursuits. As such he was sometimes accused of brusqueness and intolerance, but he had obviously no use, nor time for all the sophistications of our normal social life, nor could he afford to waste his energies on empty rituals and ceremonies, except for treating them as objects of his anthropological studies. And yet, whenever he found some time to relax, his childlike simplicity and sparkling wit were most refreshing even to those who were nearest to him and he spread laughter and sunshine around him. Towards his friends he was generous to a fault. His inner life was marked by an unmistakable streak of asceticism, while his ethical standards were unusually high and severe. Prof. D. D. Kosambi deserves to be remembered as one of the highly gifted and versatile scientific workers and indefatigable scholars of modern India for whom a relentless search for the highest human values was the only natural way of life.

V. V. Gokhale

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LIST OF PUBLICATIONS

by

Prof. D. D. Kosambi

(based on his own notes)

1. Precessions of an elliptical orbit: *Ind. Journ. Phys. 5.* 1930. 359–364.
2. Modern differential geometries: *ibid.* 7. 1932. 159–164.
3. On a generalization of the second theorem of Bourbaki: *Proc. Acad. Sci. of the U. P. 1.* 1931 (3 pages).
4. On the existence of a metric and the inverse variational problem: *Ibid. 2.* 1932. 17–28.
5. On differential equations with the group property: *J. Ind. Math. Society 19.* 1932. 215–219.
6. The problem of differential invariants: Jubilee memorial volume of the *J. Ind. Math. Soc. 20.* 1933.
7. Geometrie differentielle et calcul des variations: *Rendiconti d. R. Accad. Naz. d. Lincei.* 1932. 410–415 (communicated by T. Levi-Civita).
8. Affin-geometrische Grundlagen der Einheitlichen Feldtheorie: *Sitz. Preuss. Akad. Wiss. Phys. Math. Klasse* 1932. 342–345. Communicated by Erhard Schmidt (misprint in 1st formula *15*).
9. Parallelism and path-spaces: *Math. Zeitschrift 37.* 1933, 608-618. The note following on pp. 619–622 of the same issue by Elie Cartan should be read jointly with the paper.
10. The classification of Integers: *J. Uni. Bombay. 2.* 1933. 18–20 (merely expository).
11. Collineations in path-space: *J. Ind. Math. Soc. 1.* 1934. 69–72.
12. Continuous groups and two theorems of Euler: *Math. Student 2.* 1934. 94–100.
13. The maximum modulus theorem: *J. Uni. Bombay. 3.* 1934. 11–12 (proof that the theorem holds for non-analytic functions provided only that they are *schlicht* in the mapping).
14. Systems of differential equations of the second order: *Quart. J. Maths.* (Oxford), *6.* 1935. 1–12. (Einstein-Mayer field equations on P. 7; identities on pp. 9–10 used by Douglas, *Proc. Nat. Acad. Sci. (U. S. A.)* 1939 et. seq., without acknowledgement).
15. Homogeneous metrics: *Proc. Ind. Acad. Sci. 1.* 1935. 952–954. Shows that certain types of connections might admit only a metric homogeneous of degree zero, not of Finsler type).

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16. An affine calculus of variations: *Proc. Ind. Acad. Sci. 2.* 1935. 333–335 (extension of tensor analysis to higher order differential equations).

17. Differential geometry of the Laplace equation: *J. Ind. Math. Soc. 2.* 1936. 141–143. (It was later pointed out by T. Levi-Civita in a friendly letter that the essential results had been obtained by him before 1907, and Emile Cotton in 1913).

18. Path-spaces of higher order: *Quart. J. Maths.* (Oxford). *7.* 1936. 97–104. (Actual execution of the ideas of 16; basis for the work of V. Seetharaman, *Proc. Lond. Math. Soc.* 1938; also frequently utilized by Kawaguchi, Hombu, Hokari, Ohkubo and other members of the Japanese school of differential geometry and tensor analysis).

19. Path–geometry and cosmogony: *Quart. J. Maths. 7.* 1936. 290–293. (First application of the new methods developed in nos. 7, 9, 14, 15 to Milne's work. The divergence of points of view led to misunderstanding and polemical criticism, on both sides).

20. Les metriqués homogènes dans les espaces cosmogoniques: *Comptes Rendus* (Paris) *206.* 1938. 1086–1088.

21. Les espaces des paths généralisés qu'on peut associer avec un espace de Finsler: *ibid.* 1538–1541. Development of 20. (The theoretical bases for reverting from Milne's paths to a metric, and a complete set of conditions for associating a metric in n–space with that in an n+1–space, logically necessary for any theory of relativity).

22. The tensor analysis of partial differential equations: *J. Ind. Math. Society 3.* 249–253. But the Japanese translation appeared first as in the journal: *Tensor*, No. 2, Aug. 1939. 36–39 (Translation by H. Hashimoto), followed by a comment in Japanese by A. Kawaguchi.

23. A note on the trial of Sokrates: *Fergusson Coll. Mag.* July 1939, 1–6 (Sokrates and the class–war of his day); Reprinted in 109, below.

24–25. Various reviews in *The New Age*, *National Front*, and related publications. J. B. S. Haldane on *Marxist philosophy and the sciences*, J. D. Bernal on the *Social functions of science*, G.D.H. Cole and R. Postgate on the *Common people*, etc.

26. The emergence of national characteristics among three Indo–European peoples: *ABORI 20.* 1940, 195–206. Trial speculation on Indology.

27 (a): The function of leadership in a mass movement; (b): The Cawnpore Road: *Fergusson Coll. Mag.* 1939–40, 1–7. (A critique of dialectical–materialistic social theory; a story

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published under the pseudonym "Ahriman" reprinted in 109, below.

28 (a): Revolution and the progress of science: *New Age 5.* 320–325. (A survey of the effects of the revolution upon mathematics in the *USSR.*)

28 (b): Science learns the goose-step: *ibid.* pages unknown, as the journal was suppressed soon after. (A protest against the dismissal of T. Levi-Civita from the editorship of the Zentralblatt fur Math. and subsequently from all Italian academies, on grounds of his being a Jew).

29. Path-equations admitting the Lorentz-group-1: *J. Lond. Math. Soc. 15.* 1940. 86–91, reprinted (for the offprints), *Fergusson Coll. Mag.* February 1941.

30. A statistical study of the weights of old Indian punch-marked coins: *Current Science 9.* 1940. 312–314.

31. The concept of isotropy in generalized path-spaces: *J. Ind. Math. Soc. 4.* 80–88 (With an application to Milne's cosmology in the final portion.)

32. A note on two hoards of punch-marked coins found at Taxila: *New Ind. Antiquary 3.* 1940, 156–157. (A review of the memoir by E. H. C. Walsh on the subject.)

33. A note on frequency distribution in series: *Math. Student 8.* 151–155. (Methods of generating other distributions than the Poisson and the binomial); see no. 75 and no. 108.

34. (a): On the study and metrology of silver punch-marked coins: *New Indian Antiquary, 4.* 1941. 1–35 and 49–76. (Numismatics as a science, with an application to its most difficult problem). (b): Additions and corrections, ibid *5.* 1942, May.

35. A bivariate extension of Fisher's Z-test: Current Science *10.* 1941. 191–192. (The precise analogue, by readjusting the degrees of freedom, of Fisher's z-test, for a bivariate population).

36 Correlation and time-series: *ibid.* 372–374. (Pointing out that the correlation coefficient is meaningless if calculated when the variance of one of the two variates is infinite).

37. The quality of renunciation in Bhartṛhari's poetry: *F. Coll. Mag.* 1941. (A study in comparative literature. Republished with changes in *Bhāratīya Vidyā* 1946. 49–62; reprinted in 109, below.

38. Path-equations admitting the Lorentz group-II: *J. Ind. Math. Soc. 5.* 1941. 62–72. (Continuation of 29; for further work, see the series of papers by Mohd. Shabbar, *Proc. Ind. Acad. Sci.* 1940, 1941).

39. On the origin and development of silver coinage in India: *Current Science 10.* 1941. 395–400. Shows that the punch-

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marked coinage system developed from Mohenjo-Daro cut silver pieces.

40. On valid tests of linguistic hypotheses: *New Indian Antiquary 5.* 1942. 21–24. Shows that Zipf's "inverse square" law is not valid in linguistics. This paper was then called to the special attention of linguists by A. J. Lotka.
41. Zeros and closure of orthogonal functions: *J. Ind. Math. Soc. 6* 1942. 16–24.
42. The effect of circulation upon the weight of metallic currency: *Current Science. 11.* 1942, 227–231. Shows linear decrease of weight with use of coins; independence of correlation and denomination; continuation of 34 for modern coins.
43. A test of significance for multiple observations: *Current Science 11.* 1942. 271–274. A tentative approach to statistics in function-space.
44. Progress in the production and consumption of textile goods in India: *J. Ind. Merchants' Chamber* (Bombay), Jan. 1943, 11–15. Published as by "Vidyarthi" and Miss Sushila Gokhale.
45. Race and immunity in India: *New Indian Antiquary 6.* 1943. 29–33. Shows that the supposed immunity of the Hunzas is due to a rigorous climate as Darwinian selective agency.
46. Statistics in function space: *J. Ind. Math. Soc. 7.* 1943. 76–88. Shows how statistics may be extended to a population of functions by using orthogonal functions and integral equations.
47. The estimation of map distance from recombination values: *Annals of Eugenics 12.* 1944. 172–175.
48. Soviet victory and the world revolution: *Indo-Soviet Journal 2.* (Nov. 7, 1943), p. 6. Shows that the theory of world revolution had not been abandoned by the USSR, as of that date.
49. The Parvasaṃgraha of the Mahābhārata: *JAOS, 66* (2), 1946, 110–117; followed by the counts of E. D. Kulkarni, *ibid,* 118–144. First complete discussion of the problem and of V. S. Sukthankar's concept of a "fluid text".
50. The geometric method in mathematical statistics: *Am. Math. Monthly 51.* 1944. 382–389. Derivation of all elementary distributions by the geometric method first introduced by R.A. Fisher.
51. The Law of large numbers: *Math. Student 14.* 1946. 14–19.
52. The change in the Soviet constitution: *Indo-Soviet Journal 2.* (9). 1944.
53. Direct derivation of series spectra: *Current Science* 13. 1944. 71.
54. Caste and class in India: *Science and Society 8.* 243–249. Comment on an article by P. Rosas on the subject.

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55. Parallelism in the tensor analysis of partial differential equations: Bulletin *Am. Math. Soc. 51* 1945, 293–296.
56. Soviet Science: What can it teach us? *Indo-Soviet Journal 11–13.* June 22, 1944.
57. George David Birkhoff: 1884–1944 (Obituary). *Math Student 12.* 1944. 116–120.
58. The Raman effect (Anonymous, as by an "Indian Scientist"), *People Age.* July 22, 1945.
59. Some extant versions of Bhartṛhari's *Śatakas*: *JBBRAS 21.* 1945. 17–32.
60. On the authorship of the Śatakatrayī: *JOR* (Madras) *15.* 1946. 64–77.
61. *The Śatakatrayam of Bhartṛhari with the commentary of Rāmarṣi*, edited in collaboration with Pt. K. V. Krishnamoorthi Sharma, Poona 1945, 2 + 140 + 6 + 1, Ānandāśrama Sanskrit Series, no. 127.
62. The Village community in the "old conquests" of Goa: *J. Uni. Bombay 15* (4). 1947. 63–78.
63. Sur la différentiation covariante: Comptes Rendus (Paris) *222.* 1946. 211–213.
64. Silver punch-marked coins with special reference to the East Khandesh Hoard: *J. Num. Soc. Ind. 8.* 1946. 63–66.
65. Early stages of the caste system in northern India: *JBBRAS 22.* 1946. 33–48.
66. *The Southern Archetype of Epigrams ascribed to Bhartṛhari.* Bhāratīya Vidyā Series 9, Bombay, 1946. 176 + 13 + 8. The first critical edition of any Bhartṛhari recension.
67. An extension of the least-squares method of statistical estimation. *Annals of Eugenics, 13,* 1947, 257–261.
68. Parvasaṁgraha figures for the Bhīṣma-Parvan: (with E. D. Kulkarni) *JAOS 71.* 1951. 21–25.
69. Some applications of the functional calculus. (Presidential Address to the Mathematics Section of the Indian Science Congress, Delhi, Jan. 1947, completely ruined in the printing; no proof shown to the author).
70. Les invariants differentiels d'un tenseur covariant a deux indices: *Comptes Rendus 225,* 1947. 790–792. Also Differential invariants of a two-index tensor, *Bull. Am. Math. Soc. 55.* 1949. 90–94.
71. Early Brahmins and Brahminism: *JBBRAS 23.* 1947. 39–46.
72. Systems of partial differential equations of the second order. *Quart. J. Math. 19.* 1948. 204–219.
73. *The Epigrams Attributed to Bhṛtṛhari.* (Singhī Jain Series 23) Bombay, 1948; pp. viii + 82 + 240. This is the first comprehensive edition of the poet's works and still remains the

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editio princeps, being cited in books on Indian text-criticism as a landmark in critical methods.

74. Chronological order of punch-marked coins— I: *JBBRAS, 25.* 1948–9, 33–47.
75. Characteristic properties of series distributions. *Proc. Nat. Inst. Sci.* (India) *15.* 1949. 109–113; see no. 33; sequel in no. 108.
76. Lie Rings in Path-space: *Proc. Nat. Acad. Sci.* (U. S. A.) *35.* 1949. 389–394.
77. The Avatāra syncretism and possible sources of the *Bhagvad-Gīta*: *JBBRAS 24-25.* 1948–49, 121-134.
78. Marxsim and ancient Indian culture (adverse review of S. A. Dange's "India from Primitive Communism to Slavery"): *ABORI 29.* 1949. 271–277. Reprinted in *India Today.*
79. On the Origin of Brahmin Gotras: *JBBRAS 26.* 1950. 21–80.
80. Series Expansions of continous Groups: *Quart. J. Math.* (2). *2.* 1951. 244–257.
81. Chronological order of punch-marked coins-II: The Bodenāyakanūr Hoard: *JBBRAS 26.* 1951. 214–218.
82. Urvaśī and Purūravas: JBBRAS 27. 1951. 1–30. Reprinted in *Indian Studies: Past & Present,* vol. 1. Calcutta 1959. 141–175, and in 122* below.
83. On a Marxist approach to Indian chronology: *ABORI 31.* 1951. 258–266.
84. Seasonal variations in the Indian birth-rate (with S. Raghavachari): *Ann. Eugenics 16.* 1951. 165–192. Cited for use of polar coordinates in periodic biological phenomena. Presents considerations on birth control also.
85. Path-spaces admitting collineations: *Quart. J.Math.* (2) *3.* 1952. 1–11.
86. The Cintāmaṇi-sāraṇikā of Daśabala: *Supplement* to *JOR* (Madras), 1952, 8 + 15; edition of a Sanskrit astronomical work, which shows incidentally that king Bhoja of Dhārā died in 1055–6.
87. The Sanskrit equivalents of two Pali words: *ABORI 32.* 1952. 53–60. Gives the correct derivation of *sammapāso* and *vassakāra.*
88. Path-Geometry and continuous groups: *Quart. J. Math.* (2) *3.* 1952. 307–320.
89. Imperialism and Peace: *Monthly Review. 3.* 1951. 45–49.
90. Ancient Kosala and Magadha: *JBBRAS 27.* 1952. 180–213.
91. Science and freedom: *Monthly Review 4.* 1952. 200–205; in longer form *Vijñān-Karmee 4.* October 1952. 5–11.
92. Geldner's Rgveda: *JOR* (Madras), 1952, 291–295 (essay review, with special attention to words like *ibhya*).

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93. Chronological order of punch-marked coins–III: The Pailī Hoard: *JBBRAS 27.* 1952. 261–271.
94. Brahmin clans: *JAOS 73.* 1953. 202–208. Review and critique of J. Brough's book: *The early brahmanical system of gotra and pravara,* (Cambridge, 1953). Mistaken for a polemic.
95. Seasonal variation in the Indian death rate (with S. Raghavachari): *Annals of Human Genetics 19.* 1954. 100–119; complements no. 84.
96. The Periodization of Indian History. *ISCUS 1,* 1954, pp. 40–55. Arbitrarily changed by the editors, without consulting the author.
97. Notes on the class structure of India: *Monthly Review 6.* 1954, 205–213; see 109, below.
98. The metric in path space: *Tensor* (New Series), *3.* 1954. 67-74
99. What constitutes Indian History? *ABORI 35.* 1955. 194–201. Essay review of the first three volumes of the Bhāratīya Vidyā Bhavan's history of India.
100. The basis of ancient Indian history–1: *JAOS 75.* 1955. 35–45; II, *ibid.* 226–237.
101. The working class in the *Amarakośa: JOR* (Madras) *24.* 1955. 57–69. Shows the existence of a hierarchical principle in the *Amarakośa* clāssification.
102. Origins of feudalism in Kaśmīr: *JBBRAS* (Sārdhaśatābdi volume). 1956–7. 108–120.
103. Indo-Ariiskii Nosovoi Ukazatel': Sovetskaya Etnografia (Ak. Nauk USSR), No. 1, 1958, 39–57. Demonstrates the unreliability of nasal-index data in theorising about Indian racial groups.
104. On the development of feudalism in India: *ABORI 36,* 1956. 258–269; adverse critique of Soviet Professor K. A. Antonova's theories.
105. The method of least squares: (Chinese text, Ac. Sinica, unknown publicalion, in 1957). *Journal of the Ind. Soc. Agricultural Statistics 11.* 1959. 49–57. Solves abstract equations, including integral equations for atomic piles (diffusion).
106. The *Subhāṣitaratnakośa* of Vidyākara (*ed.* with V. V. Gokhale *HOS, 42,* 1957. The oldest known general anthology of classical Sanskrit verse. A fragment was edited by F. W. Thomas under the erroneously conjectured title *Kavīndra-vacanasamuccaya* (Calcutta, 1912).
107. *Introduction to the study of Indian History.* Popular Book Depot, Bombay, 1956. See particularly the reviews by A. L. Basham (*BSOAS*), D. H. H. Ingalls (*JAOS*) L. Renou (*JA*).

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108. Classical Tauberian theorems: *J. Ind. Soc. Ag. Stats. 10*, 1958, 141–149. Points out intimate connection with probability distributions, leading to improved methods.

109. *Exasperating Essays*: People's Book House, Poona, 1957. Republication of 23, 27, 37, 97 above; and some other writings.

110. The efficiency of randomization by card shuffling. (With U. V. R. Rao). *J. Royal Stat. Soc. 121*–ii. 1958. 223–233. Analysis of statistical defects underlying para-psychological experiments.

111. Dhenukākaṭa: *JBBRAS 30*. 1957. 50–71. Identification of the ancient Greek colony in Maharashtra. Also, complete text and translation of all known Brāhmī inscriptions in Māval caves, including one from Kārle hitherto unpublished. The first photograph of the Sphinx on a Kārle pillar.

112. The text of the *Arthaśāstra*: *JAOS 78*, 1958, 169–173. Shows that about a quarter of the original work is lost, but more or less uniformly over the whole text.

113. The basis of despotism: *Economic Weekly* (Bombay) Nov. 2, 1957; *pp.* 1417–9. Review of K. A. Wittfogel's *Oriental Despotism.*

114. Notes on the Kandāhār edict of Asoka: *JESHO 2*. 1959. 204–6.

115. China's communes: *Monthly Review* 10. 1959. 425–429.

116. Primitive communism: *New Age* (Monthly) *8* (2) Feb. 1959; pp. 26–39 First treatment of 'communism' in primitive society, without idealization of ethnographic data.

117. Social and Economic Aspects of the *Bhagvad-Gītā*: *JESHO 4*. 1961. 198–224. Revision of an article originally published in *ENQUIRY 2*, 1959, 1–20.

118. Indian feudal trade charters: *JESHO 2*. 1959, 281–293. Special treatment of the Viṣṇusena charter of 592 *A.D.*, correcting D. C. Sircar's gruesome mistakes.

119. An application of stochastic convergence: *J. Ind. Soc. Ag. Stats. 11*, 1959, 58–72; shows that if the primes in suitably defined covering intervals behave like an unbiassed random sample, then the Riemann hypotheses follows.

120. At the crossroads: *JRAS* (London) 1960, 17–31; 135–144. Russian translation in *Indicheskii Etnograficheskii Sbornik* (1961) 45–65.

121. Kaṇiṣka and the Śaka era: *Marg* April 1962; also *JBBRAS* 1962. *35*, 36–37. Originally presented and accepted as a late paper to the Kaṇiṣka conference, *SOAS*, London. April 20–22, 1960. Identifies Kaṇiṣka I with Soter Megas and Kaṇiṣka II with the king of the coins.

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122. *Myth & Reality/Studies in the formation of Indian Culture.* Bombay, 1962. Reprints of 117, 82, 120, and 62 with illustrations, an introduction, with a new chapter on the prehistory of Mahārāṣṭra, based on the writer's own field-work.

123. Pierced microliths from the western Deccan plateau: *MAN* Jan 1962, note *4*, pp. 10–12. Apparently the first announcement of such microliths.

124. Megāliths in the Poona District: *MAN*, May 1962; note no. 108 pp. 65–7 + plate.

125. The sampling distribution of primes: *Proc. Nat. Acad. Sciences* (USA) *49*. 1963. 20–23. Shows that the primes numbers in intervals of fixed length on the real line transformed by $y = \text{li}(x)$ occur in a Poisson distribution.

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127. Adventure into the unknown: *Asian Thought.* (A note on the writer's personal philosophy as a scientist and research worker; by invitation of the editors, in a symposium by the Andhra University Dept. of philosophy; yet to appear in print).

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